

Research and Development Program for the Rare Isotope Accelerator

Gene Henry
Office of Nuclear Physics

August 26, 2003
Four Points Sheraton Hotel, Bethesda, Maryland

- Background and basis for the RIA R&D program
- Evolution of the program
- Funding levels
- Program for FY 2003 and 2004

Basis of the RIA paradigm

- The 1999 ISOL Task Force Report to NSAC largely established the present pre-conceptual design for the Rare Isotope Accelerator (RIA). The report's recommendations:
 - Design and construct a RIA facility that provides unprecedented beams of a diverse assortment of nuclei
 - That fast in-flight separated beams of rare isotopes be provided.
 - Complete pre-construction R&D on key elements of RIA
 - Timely commissioning of a CDR to prepare the project for the earliest construction start

Technical aspects of RIA from the ISOL Task Force Report

- A SRF linac is the best driver for RIA:
 - Beam energy is 400 MeV/nucleon for U; any stable element from H to U
 - Minimum power beam of 100 kW, upgradeable to 400 kW
 - 100% duty factor; simultaneous operation of multiple production targets
 - Very high reliability and beam availability
 - [SNS operating frequency]
 - [High power strippers]
- High power targets:
 - ISOL targets of several types are promising
 - Liquid lithium targets for heavy-ion fragmentation
- In-flight Isotope Separation:
 - Development of a fast ion gas catcher/ion guide

Technical aspects of RIA from the ISOL Task Force Report (Cont.)

- Post-accelerator:
 - Deliver a wide variety of beams to a wide variety of users
 - Stopped beams up to 10-15 MeV/nucleon
 - High overall efficiency and reliability
 - Utilize SRF technology to extent possible
- Fast beams:
 - 10 msr and 20% momentum acceptance
 - Use of thicker targets to enhance secondary reactions
 - Radiation environment and compression of momentum spread
- A variety of state-of-the-art experimental equipment
- Radiation handling:
 - Build on well established safety criteria at high power accelerators and ISOL facilities

Pre-construction R&D from the ISOL Task Force Report

- The ISOL Task Force and pre-construction R&D:
 - Noted that RIA is largely based on moderate extrapolations of existing technology
 - Identified no technical show stoppers
 - Identified high-leverage or long-lead time areas where R&D could have an especially strong impact on the project cost and schedule [and performance]:
 - Fast ion gas catcher and ion guide
 - Fragment momentum compression preceding the gas catcher
 - Fragment separators that handle beam spray and allow beam sharing
 - ECR sources that produce high intensity, high-charge-state uranium, and LEBT
 - Driver technologies, especially SRF accelerating structures
 - High power ISOL and fragmentation targets [and strippers]
 - Other important tasks—post acceleration RFQs etc.; detector equipment; accelerator subsystems such as diagnostics, beam dumps, controls, etc.

Development of the RIA R&D program

- In response to a national laboratory proposal in FY 2000, a group undertook the task to evaluate proposed R&D projects for RIA to be funded by NP:
 - Developed the general framework for the program
 - Effective in identifying key tasks, approaches, etc.
- In FY 2003, the process has evolved to utilize a DOE solicitation of proposals and peer review
- This Workshop is an important element of the RIA R&D program for NP:
 - Evaluate where the program is presently and what remains to be accomplished.
 - Contribute to defining the program in FY 2004.

Funding of the RIA R&D program

Funding levels by fiscal year (\$Ms)

<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004 Prsdt's Req.</u>
1.695	2.794	2.800	3.465+0.49	3.500

In FY 2003 the RIA R&D program supports 22 tasks at seven national laboratories and three universities.

Several tasks are “targets” within the FY2003 NP program as established by the budget.

The FY 2003 program

- A strong response to the Office of Science/NP solicitation for grant requests.
- Peer evaluations with both mail and panel reviews conducted.
- Supported R&D covers most aspects of a RIA facility--ion sources, driver accelerator, targets, separators, etc.
- A number of collaborative and cooperative projects involve the U.S. laboratories and universities.
- Several cooperative projects involve international researchers.

The FY 2004 solicitation

- The 2004 solicitation, “Research and development for the Rare Isotope Accelerator”, was posted on August 6, 2003 at <http://www.sc.doe.gov/grants/grants.html>

Notice DE-FG01-03FR03-23 for universities.

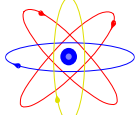
Lab 03-23 companion notice for laboratories.

Applications due October 15, 2003

- Updated opportunities from this Workshop will be posted about September 15, 2003 at <http://www.sc.doe.gov/henp/np/program/riard.htm>

Some final notes

- This RIA R&D Workshop is an opportunity for:
 - Members of NP and the community to hear the exciting work being carried out
 - Researchers to explore possible collaborations for a response to the FY 2004 solicitation
 - U.S. and international scientists to discuss topics of mutual interest and explore possible cooperative studies
- There is substantial work going on beyond that funded by the RIA R&D Program that is recognized.
- Many Thank-yous
 - Dr. Satoshi Ozaki for organizing this Workshop
 - The distinguished international panel helping Dr. Ozaki
 - The representatives of international facilities who have contributed
 - All the contributors and attendees
 - The BNL, NP, and ORISE staff who attended to the many behind-the-scenes details

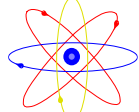


**Office of
Nuclear Physics**



Office of Science
U.S. Department of Energy

Back up



Office of
Nuclear Physics



Office of Science
U.S. Department of Energy

RIA

Rare
Isotope
Accelerator

R&D Workshop
Registration

August 26-28, 2003
Washington, D.C.

Doris Rueger
Workshop Secretary
Tel: 631.344.5663
Fax: 631.344.2166

Satoshi Ozaki
Workshop Chair

